Industrijska konoplja – ekonomske i ekološke prednosti: slučaj Srbije Olga Mašić¹

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Apstrakt: Industrijska konoplja je biljka koja pruža mnogobrojne mogućnosti čovečanstvu već deset milenijuma. Poznata kod starijih generacija kao sredstvo sa lekovitim svojstvima, izradu tekstila, prehrambenih proizvoda itd, ova biljka je znatno izgubila svoju popularnost usled rata protiv narkotika i sve pogrešne stigme koji su se uz njega pojavile. Zbog oštre klimatske promene i velike potražnje ka jeftinim i obnovljivim izvorima koji će imati što manji ‘zeleni otisak’, pažnja se polako vraća na industrijsku konoplju. Cilj ovog rada je da skrene pažnju na postojeće predrasude i mnogobrojne ekološke i ekonomske prednosti kod kultivacije ove biljke. U radu se koristila opšta metodologija, primenom induktivne i deduktivne metode, kao i metode analize i komparacije. Najveća poteškoća u istraživanju ove teme bila je u nedovoljnim i neadekvatnim objavljenim istraživanjima i činjenicama, prouzrokovanih lošom reputacijom konoplje, zbog svoje bliske (ali nebitne) korelacije sa rekreacionom drogom kanabis (poznatom kao marihuana). Sa jasnom distinkcijom ove dve vreste *Cannabis Sativa L* biljke, vrednost poljoprivrednog tržišta industrijske konoplje je u značajnom porastu, kao i potražnja obrađenih proizvoda.

Ključne reči: industrijska konoplja; ekonomske; ekološke; prednosti; Srbija;

Industrial Hemp – Economic and Ecological Benefits: The Case of Serbia

Abstract: Hemp is a plant that has been cultivated by civilizations for over 10,000 years in terms of agriculture, medicine, source of fiber, etc. Almost a century ago, for various political reasons, the plant has been banned in most regions of the world with rigorous laws and regulations. With today's concerns on overpopulation and global warming, people have started to look for alternative, natural, and economically beneficial sources. Hemp gives a simple solution as a step towards a cleaner future, one that our ancestors knew very well. Though, research on industrial hemp has had two very opposing results, some believe this is due to the misconception that industrial hemp is the same as the recreational drug, commonly known as marijuana¹⁰. Nevertheless, with the distinction of these two types of cannabis, the industrial hemp market is emerging in a rapid manner.

Keywords: industrial hemp; economical; ecological; benefits; Serbia.

Introduction

Annually, the amount of plastic thrown could circle the Earth four times, around 7.3 million hectares of forest is lost, and greenhouse gases are emitted into the atmosphere. These environmental hazards are a part of a world-wide rising problem that we are facing every day. To begin making a change, one must start locally, and from there work on out. This paper aims to review the effects of one plant on pollution, and to stimulate its growth.

Industrial hemp is what some might call a phenomenon. It can provide more than 20,000 biodegradable products, in almost every major submarket (from agriculture and the textile industry, to automotive,

¹⁰*Cannabis Sativa L; The difference between industrial hemp and 'marijuana':* Cannabis plants contain unique compounds called cannabinoids; the most well-known is THC (tetrahydrocannabinol) credited with causing the 'marijuana high'. The main difference lies in that industrial hemp has a legal limit, around the world, of up to 0.3% in THC, while marijuana has a minimum dose of 5% that can go as high as 30%. Another key ingredient in the cannabis plant is the cannabidiol, or CBD (shown as a reducer of the THC psychoactive effect). Hemp plants are richer in CBD than in THC, while the opposite goes for marijuana.

and furniture). It has both the ecological as well as economic benefits. These all are qualities that can help aid today's major waste and pollution problems. Although some research has been done regarding mass production of industrial hemp, there is too much social stigma which strongly influences funding and legal interest in the plant. The European Industrial Hemp Association stated that hemp and its compound CBD are being increasingly used in the food supplement industry as well as in the cosmetic industry and "thereby generating new investments and creating employment in the cultivation and processing of hemp and hemp-derived products" (EIHA, 2017, para. 1). In this paper, the difficulties, economic and ecological benefits of growing hemp on a larger scale in Serbia will be revised, while comparing the laws and outcomes of more progressive countries, in hopes of stimulating further research on this topic.

Methodology

In order to collect data, a mix of quality and quantity research techniques and thorough analysis, of said data, has been used for the sole intention of research purposes for this paper. By analyzing over 20 different online sites, published papers, and discussion forums, it was possible to obtain a, somewhat, clear understanding of the main problem facing the unpopularity and restrictions of harvesting industrial hemp, as well as numerous benefits and bright aspects of cultivating it. Though the findings in this research have been split into two different results of the same topic: "what are the benefits of growing industrial hemp?" I have chosen to rely on conclusions not based on the plants prejudice and associations with the drug from the same species, cannabis.

Theoretical questions

There have been numerous researches done on this topic, though they are highly influenced by laws and regulations by the region's political leaders. Heated arguments, from two opposing sides, have been led concerning cannabis and the war on drugs for many decades now. In the US, cannabis is classified as a 'schedule I' drug, alongside heroin, and lysergic (DEA, n.d.). A number of published papers have been called into question due to inaccurate results that contradict newly found results. One of the major problems, when discussing the future of *Cannabis Sativa L* in mass production, is the fear of cannabis as a, recreational drug, being mixed with the industrial sort, causing farming corruption. A simple solution lies in education, and knowing the physical differences between the two brands, as well as mandatory random check-ups.

Laws and regulations

Whereas the laws and regulations in the EU allow for 46 types of *Cannabis Sativa L* to be grown, in Serbia only 2 are permitted, even though it has never been illegal to do so. The amount of THC allowed in hemp in the EU equates to 0.2% (EMCDDA, 2017), in contrast to Serbia, that allows 0.3% (Pravilnik o uslovima za gajenje konoplje, 2013). Both the European Union and the Serbian institutions have a one year limited contract. Requirements for getting the license to grow industrial hemp, if followed precisely, don't present a problem, as the instructions are clear and simple. If one is considering starting a hemp growing business, apart from the license, finding the seeds which have to be approved by the Registry types of agriculture plants (Registar sorti poljoprivrednog bilja), might be of an inconvenience. Luckily, Serbia has its very own hemp organization "Konoplja", which helps its members in all forms, from finding the equipment to teachings about the best way to handle the hemp plant for its maximum output. What one also has to keep in mind are the regular checkups from government officials, who maintain the legality of this expanding business.

China, as the leading industrial hemp provider, has had a long and supportive role from its government. Scientists, funded by the government, have been studying the plants military, medical, and commercial use, while also developing hybrid plants that can sustain themselves and thrive in disdained environments. Even though China is accountable for more than half of the world's hemp production, half a century ago, it had rigorous laws against this plant, going as far as the death penalty if caught with fresh or dried leaves spanning from 5 to 150kg (Chen, 2017). Around the time when the Vietnam War broke, the country needed a fabric to keep its military force clean and dry, and industrial hemp had both the required fiber as well as an antibacterial benefit. From there on out, the officials realized that hemp had much to offer and began heavily investing in its further research.

Yugoslavia was one of the world's major hemp providers, which is worth mentioning when considering reviving this type of agricultural growth. Despite Yugoslavia falling apart, Serbia still has a role in hemp production. The mass production of hemp wouldn't be a novelty in this region for it has been present here for a very long time. (eKapija, 2017) Though, like said beforehand, official research, as well as prejudice, is motivated by the government and its local history. In Serbia's rural and suburban villages, hemp has been a daily part of the community, from medical teas to nutriment.

Economic aspects

The demand for industrial hemp is such that the USA has an annual income of around of \$580 million in hemp products, mentioning that all of its raw hemp material is imported (Miller, 2017). China has 3 major hemp processors, Shanxi Greenland Textiles being one of them, on a yearly basis produces 5,000 tons of yarn, 10 million meters of fabrics, 150 thousand finished textile products, all of which are for the most exported to Europe, the US, and neighboring countries (Woodford & Cui, 2016). Forbes estimates that by the year 2020, the hemp market is going to grow by 700%, with the market value of \$2.1 billion (Naturally Splendid, n.d., para. 1).

Such is the quality of hemp that selling it either raw or processed will yield substantial profits. One of the major advantages of industrial hemp is that it requires no pesticides, as the plant is a weed itself. Another advantage worth mentioning is that it does not require a lot of room to grow, yielding around 10 tons per hectare. Hemp can be 100% processed, from its roots to its leaves and seeds. More than 20,000 products can be made from hemp. It has potential to replace wood, plastic, and fiber altogether in a much cheaper manner. To cement these already staggering facts, it has to be taken into account that 1 hectare of hemp fiber equates to 4 ha of wood fiber or 2 ha of cotton fiber (Jordan, 2014). To add to that 0.4t (1 acre) of hemp has roughly 3,600kg of seeds, which, when processed can produce around 1,100l of hemp oil or almost 3,000kg of hemp flour (CGBA, 2014).

Recent reports suggest that investing in industrial hemp, in Serbia, could bring profits that are considerably high, compared to the invested finances (taking into consideration, for now, the undeveloped state of hemp culture). (Božović, 2018.) Even though the plant has seen a remarkable growth in its cultivation, Serbia has yet to take advantage of its agricultural potential. When comparing with Serbia's neighbouring countries, Croatia (an EU member) had the same undeveloped status when it came to cannabis, but with the EU regulation system, it has strived and succeeded in harvesting the plant. Serbia would greatly benefit from industrial hemp cultivation, locally and internationally.

Ecological benefits

One thing to know is that hemp can produce well over 20,000 products. Those products can be categorized in nine subcategories or markets, such as agriculture, the textile industry, recycling, automotive, furniture, etc. (Thayer et al., 2017). To name a few key products, we could start off with plastic.

Hemp plastic is already in use as composite bioplastic¹¹ that has high strength and rigidity. Another thing to note is that bioplastic is used in the construction of cars, boats, and musical instruments. 100% biodegradable shopping bags have been in mass production in more developed countries, which have not yet switched to paper product bags. With global warming being an issue, the toy company Lego has plans to phase out fossil fuel based resin by 2030 and is considering switching to hemp plastic. Despite the advantages, and the fact that this type of plastic needs between 3 and 6 months to degrade in nature, which is practical compared to hundreds of years that is needed for regular plastic, hemp plastic, which is a part of bioplastic, does not resolve the afterlife of plastic. (O'Connelly, 2017) Hemp plastic provides a far more suitable replacement for regular plastic, which has a very diverse function in everyday life. From kitchen supplies and toys, to appliances and big-scale demand, organic plastic has, undoubtedly, a profitable platform to evolve on.

With deforestation being such a widespread problem, some people would consider hemp to be an enormous benefit. This is backed up by the fact that 1 acre of hemp would equal to 4 acres of wood in terms of cellulose fiber production (essentially paper). In terms of paper production, hemp takes

¹¹Composite bioplastic: plastics made from a combination of hemp and other plant sources.

roughly a hundred days to grow, being an annual plant, while trees take at least 8 years. Another major advantage of hemp is that it is made mostly of cellulose. A staggering 75% of the plant could be used for cellulose, while the other 25% could be used for fertilizing soil. Wood on the other hand is only 30% cellulose and the other 70% is removed with toxins, which pollute the environment and waste the plant. A key difference in recycling is that wood can only be recycled 3 times, whereas hemp has the ability to be recycled 7 to 8 times without losing its rigidity. (Jordan, 2014) Similar to plastic, fiber has also a majorly developed market. When it comes to paper, one of the great categories with paper use lies in publishing. In the US alone, between half-a-million and a million books are published each year, while in Serbia around 1458 titles are published per million inhabitants (Morgan, 2013; Biznis i Finansije, 2017.). Aside from paper, industrial hemp can replace wood in terms of furniture and other goods. Even though not yet dominant, hemp-furniture has been getting increasing recognition from around the world for its durability, design and the effect it has on tree preservation.

Hemp and cotton are both used for clothing production. While hemp has a smaller ecological footprint, cotton makes up for 16% of world's pesticide use. As aforementioned, hemp does not require pesticide use; therefore its effect is not as substantial (this helps significantly reduce air pollution). Likewise, cotton requires 10,000 liters of water per kg of cotton for irrigation, but hemp, on the other hand, requires 300 to 500 liters per kg, which is an invaluable 95% reduction of water usage. Hemp does not wear out, it even softens over time and it has antibacterial properties. (Kentucky Hempsters, 2015) This trait makes it very useful, making the piece of clothing last longer, without losing its quality. The variety of types of clothes that is being made, while preserving fashion statements and exceptional nature, is staggering. One of the most famous multinational companies, Adidas, realised limited hemp sneakers designed by Bait X. Other products vary from workout clothes, to elegant ties and handkerchiefs. Some major online branding companies have organic-cotton (typically 60% hemp and 40% cotton mix). Towels and sheets made from hemp last longer and become more comfortable over time. (Ministry of hemp, 2017.)

In nutrition and even cosmetological production, hemp can play a dominant part. Industrial hemp is rich in plant-based protein, minerals, vitamins, amino and fatty acids. All these compounds make organic products that can be used in daily hygiene, food supplements, remedies, and many more. Milk, vodka, burgers, energy bars, all made from 100% organic hemp. The production of facial creams, shampoos, massage oils, even sunscreens, etc. can substitute chemicals for more natural and healthy replacements. (Felice, 2017)

Hemp can also be used as a building material. There is a special combination where both hemp and concrete are mixed to create a more ecofriendly substance, or hemp and lime which results in a sound-proofing and insulating material that is stronger and lighter than concrete (though it often needs additional support). Some of the most important advantages are isolation, antibacterial use against rodents, and rigidity against earthquakes. A home can be built (exterior and interior) completely out of hemp-derived products, spanning from fiberboards, and bioplastic, to hemp-based textiles and furniture. The prime examples of this construction material being used are the buildings in Europe, which are 10 stories high. (American Lime Technology, n.d.)

Conclusion

With all the above data reviewed, it is concluded that opting for mass industrial hemp production is the next step towards a more sustainable economy and, more importantly, towards saving the planet. Serbia has the adequate soil and climate conditions for hemp agriculture. This region has had a history with cultivating the hemp plant, being used for personal use as well as mass consumption. Even though the upsides to breeding hemp are obvious, there are still very constricting laws and regulations that need to be reformed. The government's role, considering the future of hemp production, is crucial. There should be overall funding as well as for scientific research of this type of plant, modeled on China. Needless to say, this fast growing industry presents a tremendous opportunity for job and economic growth. By encouraging people to grow and sell hemp, the butterfly effect would result in the need for more processing factories which in turn presents the opportunity for even more workers. With research, general interest and the support from the government, the agriculture community will flourish.

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